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ABSTRACT

This paper describes some findings from language development research and from studies in which comprehension of certain sentence structures in written materials was examined. The paper is divided into four sections. "Language Development Studies" discusses research that looked at the sentence structures of produced language of groups of children, the measurement of language development by observing children's receptive understanding of specific language structures, and acquisition of the common structures of language. "Studies of Reading Comprehension of Syntactic Structures" discusses structures common in basal reading texts for elementary school children and studies which have identified specific syntactic structures which cause difficulty in reading comprehension. "Analysis of Syntactic Structures Found in One Basal Program" presents an analysis of three stories intended for intermediate pupils to read. And "Instructional Recommendations" presents some teaching ideas to help intermediate pupils better understand difficult structures. (WR)

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LANGUAGE DEVELOPMENT AND READING COMPREHENSION IN THE MIDDLE GRADES

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Among other criticisms that are directed toward schools these days is that an inordinate amount of time is spent teaching children how to attack new words compared with the time spent in helping children improve their reading comprehension. I recently heard Neil Postman make that criticism on the radio, and it is one with which I agree. For example, I see many primary grade teachers competently helping children apply well-taught word attack skills in their reading, but I seldom see intermediate grade teachers so effectively help children understand difficult passages. In defense of the latter group, it is probably easier to teach identifiable word attack skills than to teach the components of comprehension. What I propose to do this afternoon is to describe some findings from language development research and from studies in which comprehension of certain sentence structures in written materials was examined. This research may help us understand areas of comprehension difficulty intermediate grade pupils encounter. For, if difficult structures are found to be prevalent in basal reading materials, then pupils will need help in interpretation, and I will make some instructional recommendations to that effect. My goal is, then, to share with you some techniques for teaching one small portion of instruction in reading comprehension - literal understanding of structure and organization of sentences - based on research in language development and reading comprehension.

That a relationship exists between pupils' oral language development and their reading comprehension has been demonstrated by a number of studies. For example, Ruddell (1965) found that fourth grade children's reading

CS 001 592

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comprehension was much higher when the reading material was composed of sentence structures like those most frequently used in their oral speech than when written materials were composed of sentence structures of low frequency in their speech. I think it will be helpful to keep this relationship in mind during this talk.

Language Development Studies

When attempting to trace the language development of intermediate grade pupils, we are fortunate to have a series of studies which complement and support each other. The questions we must ask are: What kinds of sentence structures do children at this level use most frequently and how does language mature through the latter years of the elementary school? As many of you undoubtedly know, the development of Hunt's T-Unit (one main clause and the subordinate clause attached to it) has enabled researchers to quantify the changes occuring in speech and writing during the school years. In Hunt's studies (1965, 1970) and in the O'Donnell, Griffin and Norris study (1967) a steady growth was found in the length of the T-Unit as the grades progressed. This was true to a certain extent in both the production of speech and in writing, but the complexity of language was greater in writing than in speech by the fifth grade. In addition to growth in the length of the T-Unit, researchers found that there are longer clauses and more clauses per T-Unit with advancement by grade. In other words, instead of linking simple sentences together with the conjunction and, a frequent pattern for preschoolers and for primary grade pupils in their writing, middle grade pupils begin to subordinate one sentence into another, thus, clauses become more frequent. Or, another way of putting it, children relate one idea into another. For example, the youngster who says

MY DOG CHASED THE CAT AND THE CAT RAN UP THE TREE.

is simply linking two equal ideas. If he said

MY DOG CHASED THE CAT WHO RAN UP THE TREE.

he would be relating through a relative clause a causal idea not possible when the two sentences are simply linked by and. It is important to note that one of the greatest areas of growth from grade 4 to 8 to 12 was the increase of adjective clauses and use of nominal expressions. In a later study, Hunt (1970) found that the number of subordinate clauses increased only to grade 8 and then levelled off. Apparently, during the intermediate and junior high grades, pupils express themselves through subordination and later more and more frequently through reductions wh ch are even more complex.

It would be a mistake to assume that children first learn to subordinate clauses into a main clause only in the intermediate grades. O'Donnell, Griffin and Norris found that even in kindergarten, children occasionally use the structures found more commonly in the later grades. Maturity of language was not, in these studies, so much a matter of basic acquisition of new structures as of the ability to use structures more and more densely.

Other researchers have discovered that it is possible to hasten the normal development of language use. A recent study by O'Hare (1973) demonstrated that practice in combining simple sentences enabled seventh graders to write sentences which were more complex than those of seventh graders without that practice. We do not know if such training would result in hastened language maturity with younger children, but it is likely. What needs study is if reception of complex sentences (reading) can be improved with similar techniques.

The studies referred to so far have looked rather generally at the sentence structures of produced language of groups of children. Another way of measuring language development is to closely observe children's receptive understanding of specific language structures. Carol Chomsky (1969) has

examined children from about the age of six to ten to try to locate structures which are actually acquired during that period. She was interested in finding if children could understand the meanings associated with special situations in the English language which must be interpreted differently from what would be expected. For example, she demonstrated that although in both

BOZO PROMISED DONALD TO STAND ON THE BOOK.

and

BOZO TOLD DONALD TO STAND ON THE BOOK.

one must look below the immediate surface of the sentence to locate the subject of the verb stand, in the first, it is Bozo, the furthest noun, and in the second it is Donald, the nearest noun. Most verbs would be like the second where the closest noun is the referent; promise is a unique verb with a special underlying form. Like other special words which require unique interpretations, children who have not yet learned about promise assign the same referent to it as they do to tell; they say that Donald is the subject of stand in the first as well as the second sentence. When in doubt, children assign the nearest referent.

It appears, then, that children have not learned all the structures of the language at the start of elementary school. Chomsky also related the stages of language acquisition she found in the school children with their reading experience, not their measured reading achievement, and found high correlations between sophistication of language knowledge and literary experience, individual interviews with the child and parent about reading habits, and the naming of books read (1972). Apparently, not only is oral language output related to reading as Ruddell (1965) showed, but so is reception of language.

These studies of language development show that even though children have acquired most of the common structures of the language, they learn to sub-

ordinate ideas into clauses (particularly relatives) to express more complex thinking. They do not often reduce simple sentences to less than a clause, however. And not all of the special rules of the language have been acquired. It would not be surprising to find that in reading, children find certain structures difficult, too. Let us turn to a group of studies which will offer some information about this.

Studies of Reading Comprehension of Syntactic Structures

There is a growing body of evidence to suggest that some structures common in basal reading texts for elementary school children are difficult to understand. I would suggest that those structures difficult to understand in reading are also uncommon structures in produced language. Simons (1971) studied the relationship between young readers' achievement on a cloze test and their ability to choose the one sentence of a group of three which had a different meaning. For example:

WHAT THE BOY WOULD LIKE IS FOR THE GIRL TO LEAVE.
FOR THE BOY TO LEAVE IS WHAT THE GIRL WOULD LIKE.
WHAT THE GIRL WOULD LIKE IS FOR THE BOY TO LEAVE.

He found a correlation of .73 between ability to identify sentences which meant the same but had different surface structures and cloze performance. Apparently, comprehension is related to understanding of sentence deep structure. Bormuth et. al. (1970) found that fourth graders were weak in ability to use basic syntactic cues to understand sentence meaning. And, in another study by Coleman (1964), undergraduate students could understand passages better when they were written in shortened rather than longer sentences, particularly if subordinate clauses, participial clauses, infinitives, and if, but, or and for clauses were written as separate sentences. We do not know if the same is true of elementary children, but I assume it is.

Other studies have identified specific syntactic structures which cause

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difficulty in reading comprehension. For example, Hamilton and Deese (1971) found that older students could understand embeddings of clauses better when they were to the right of the main clause than to the left or in the middle. Coleman (1963) found that active sentences are easier than passive to understand. And nominalizations such as John's description of it are more difficult than John described it for undergraduates, a finding replicated (Coleman and Blumenfeld, 1963). Some other structures which cause difficulty for children (Fagan, 1971) are appositives, -ing nominalizations, genitive pronouns, and especially deletion transformations. Time changing elements are difficult to understand for fourth graders (Bormuth et. al., 1970). Sentences in which the time change is between sentences were particularly difficult. (As we entered, the curtain rose. Joe found the others. He had looked for them everywhere, respectively.) Specific connectives which cause comprehension problems for intermediate grade readers are:

> however, thus, although, which, and yet, and these structures are common in basals in grades 4, 5 and 6 (Robertson, 1968). Another study of connectives (Stoodt, 1972) suggests that to the list above should be added: but, when, so, or, where, while, how, that, if. The latter study found a significant relationship between general comprehension ability and ability to understand connectives. A recent study by a colleague of mine (Richek, 1974) discusses the difficulty caused by pronouns in the second of a coordinated clause which refer to a noun in the first clause. For example, in John saw Mary and he said hello to her, the he is less easily identified by third graders in complex sentences than if the noun is repeated.

To summarize, we have found that children in the intermediate grades are growing in ability to subordinate clauses and do not reduce simple sentences to less than a clause nearly as often. Identifying the referents in some

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unusual structures is very difficult for children up to the age of ten. Comprehension of written material depends on the language development of the reader and his ability to uncover the underlying forms of the sentences he reads. And apparently, some forms of sentence structure are difficult for readers in the intermediate grades. More specifically, the following structures are difficult for pupils at this level or for older students (in which case we can assume young readers have at least the same difficulty): left and center embeddings, passives, nominalizations, appositives, time changing elements, certain other connectives, previous referring pronouns in some settings, and various deletions. Before we make instructional recommendations, we should find out if these structures are found in basal texts at the intermediate level.

Analysis of Syntactic Structures Found in One Basal Program

That these structures cause difficulty is crucial only if they are found in the reading materials intermediate pupils read. I examined three articles closely (one each at grades 4, 5 and 6) to find 1) if there was a growth in the number of clauses and sentence length to match the development of children's produced language and to find 2) if those structures found to cause difficulty were prevalent in the materials. The three articles were taken from the new (1973) Holt, Rinehart and Winston series. They were each located in the middle of the text and were of approximately the same length. Each was an informational article. Of course, one story from a book does not represent the whole text, and what is true of one story in one basal is not necessarily true of other basals. However, this small sample can reveal internal changes in the one program; if no change in maturity of syntax or if a number of difficult structures are found, we can assume that the editorial process which controls readability has not taken syntactic factors seriously into account.

The table displays the findings from these three stories. In answer to the first question (Is there a change in the general direction of language development observed in produced language?) the data show that there is not much change in length of sentences or in the number of clauses per sentence. Indeed, in regard to both factors, the grade 4 story has more density of clauses and longer sentences. There does not appear to be a growth factor related to language development in these stories.

The second question asks: Are there many difficult syntactic structures found in the stories? We find that of the difficult connectives, only but, when, so, or, that, and if appear in our sample more than a couple of times. Yet these connectives warrant instructional attention to help young readers.

Of far more concern are the large numbers of nominalizations, passives, and appositives used in the articles. In fact, the large number of passives in the fifth grade article demonstrates its author's unique style, a style which is maintained in spite of editing. Although the informational, didactic format of the articles is probably more conducive to non-fiction than fiction; nevertheless intermediate grade pupils are expected to read with understanding. There seems to be an unnecessarily large number of difficult structures.

Another factor found in this cursory examination is that while most embeddings (clause attachments) occur to the right of the main clause, in a number of cases, clauses are attached to the left and some in the center. The left embeddings are often adverbial clauses which have the added difficulty of time change connectives. Pupils need to learn the time relationship between subordinate and main clause. The clauses attached to the middle of the main clause are most difficult since the embedded clause usually separates the main clause subject and predicate.

Analysis of the sentence structures in the three articles examined lends tentative (tentative due to the size of the sample) conclusion that not only

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TABLE 1

Syntactic Structures Found in Three Basal Stories

	Level 13 (gr 4)[a]	Level 14 (gr 5)[b]	Level 15 (gr 6)[c]
Number of sentences	48	56	61
Number of words	909	801	989
Average length of sentences	18.94	14.30	16.21
Number of clauses [d]	93	95	105
Number of clauses per sentence	1.94	1.70	1.72
STRUCTURES			
Adjective clauses	23	17	14
which	5	4	4
that	11	3	6
where	-	2	1
what	2	2	1
in order to	-	1	-
with no clause connective	5	5	2
Adverbial clauses	15	10	12
when	6	2	4
while	-	-	-
since	-	-	-
after	-	-	1
before	1	-	1
as	7	7	3
until	1	-	-
Difficult connectives in coordinated sentences [e]			
however	-	-	1
yet	1	-	1
but	13	4	7
so	4	-	1
or	1	4	1
how	2	-	1
Nominalizations	6	2	6
Passives	7	28	13
Appositives	13	2	7
Left Embeddings	6	1	14
Center Embeddings	7	2	3
Right Embeddings	30	23	12

[a]From D.C. Peattie, "The Colonial Parade." Time to Wonder. B.J.Weiss and L.C. Hunt. New York: Holt,Rinehart and Winston, 1973, 249-254.

[b]From J.and R. Bendick, "What Television Is." Freedom's Ground. Holt, 234-238.

[c]From H.S. Zim, "Tidal Waves." Riders on the Earth. Holt, 236-240.

[d]A clause is counted if it contains a predicate.

[e]Other connectives named as difficult were not found in stories.

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does this program not support the growth patterns of language development of intermediate grade pupils, but this analysis also suggests that many structures which cause specific comprehension difficulty are not edited out. I belive that, if these conclusions are found to be true in a wider sample of textual material, then we must create techniques to help pupils interpret the language of their reading materials.

Instructional Recommendations

The exemplary sentences displayed demonstrate more clearly than numbers the dimensions of the problems we have been discussing. Nearly every sentence has more than one of the difficult structures mentioned. Our goal is to help children uncover the underlying meanings of deleted elements as in (2) where that are or which are are deleted and to understand the difficult connectives and relationships.

One technique to use is to ask direct questions which identify a specific relationship. This is suitable for sentence structures which are not so difficult such as adjective clauses. Thus, when considering sentence (1) one might ask: What has been reckoned? What about the globe? Even with sentences like (2) direct questions might help children restate with the clausal connective used. A question like "Can you finish this? "There are television signals which _____" might encourage pupils to bring deletions to the surface.

Perhaps more understanding occurs when we help children break such complex sentences into components or kernels. This process is the opposite of that used in the O'Hare study referred to earlier; instead of putting kernels together, complex sentences are broken down. This technique can be used with many different sentence structures. For example, with sentence (10), children can be directed to find these "little sentences": That is a mammal. A mammal

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Sample Sentences Illustrative of Difficult Structures

(1) Adjective clause: "It has been reckoned that there are about 700,000 known animals now living on this spinning globe which is our common home." (level 13, 249)

(2) Adjective clause with no clause connective: "On top of a relay station are big reflectors which scoop up the television signals aimed at them." (level 14, 237)

(3) Adverbial clause: "Since the beginning of history, stories of great tidal waves have appeared over and over again." (level 15, 238)

Other difficult connectives:

(4) But: "But when a naturalist uses the word animal, he means any living thing that is not a plant." (level 13, 250)

(5) "An eagle can live as long as that, but, roaring over mountain and forest, it reaches heights of adventure and experience impossible to the cold-blooded salamander." (level 13, 251)

(6) So: "Japan has been hit many times, and so have Hawaii and other Pacific islands." (level 15, 237)

(7) If: "If millions of tons of these deposits slip down, the nearby water may be given a tremendous push." (level 15, 236)

(8) Nominalizations: "What does attract attention, more often, is the way the sea withdraws." (level 13, 252)

(9) Passive: "And the winners at the great game of endurance are admired." (level 13, 252)

(10) Appositive: "That's a mammal, of course, one of the 'higher' animals, as they are sometimes called." (level 13, 249)

(11) Left embedding: "When you eat meat or slip into a woolen sweater or put on your leather shoes, you have an animal to thank every time." (level 13, 249)

(12) Center embedding: "The water may recede for ten minutes or more, and this retreat, which seems like a very low tide, is the origin of the name tidal wave." (level 15, 237)

(13) Right embedding: "Most tidal waves are caused by earthquakes, also known as seismic disturbances." (level 15, 236)

(14) DELETIONS*: "The record age for a horse is fifty years, for an owl sixty-eight, for a dog twenty-two, for a toad twenty, for a lobster fifty, for a pelican fifty-one, for a bullfrog sixteen." (level 13, 253-254)

* Deletions were not counted in sample constructions in Table 1 but should also be considered in instruction.

is a higher animal. Mammals are sometimes called higher animals. It is important that with left and center embeddings children learn to pull the embeddings out so that the main clause subject and predicate are put back together, as it were. Sentence (12) is composed of the following "little sentences": The water may recede for ten minutes or more. The retreat is the origin of the name tidal wave. The retreat seems like a very low tide. Of course, in the process of learning to find kernels, children should begin with easier coordinated structures. It may be motivating for pupils to work on the complex sentences in pairs.

With passives I would suggest rewriting simple passives like Joe was hit by Bill into the active form, and then tackling later more complex sentences. The sentence (13) passive structure is probably easier than that of (9) since in (13) the actor (by earthquakes) is stated and in (9) it is not. Children can speculate on an appropriate actor like people when rewriting (9) into active form. Rewriting is also recommended for nominalizations. Thus, the underlined portion of (8) would be: something attracts attention.

When working with specific difficult connective words, it is probably a good idea to deal with elements of the contextual meaning. For example, children can work with simple coordinated sentences with but until they perceive that but connects two parts and also that the second part denies the assertion of the first. Once a few different connectives have been studied, coordinated sentences with the connectives left blank can be presented. In pairs, children can fill in the blanks with the most appropriate connective. After time element connectives associated with adverbial clauses have been studied, this partial cloze technique can be used in a similar fashion. When learning time element connectives, children should be encouraged to figure out which part of the sentence occurs first in real time and which next.

Included in the list of sentences is (14), a sentence replete with

deletions. One study cited found that deletions cause difficulty in comprehension. We can see that others in the list also have deletions: for example, in (6) so stands for has been hit in the second clause. I expect that (14) is an extreme example, but we can easily recognize how children might lose track of the deleted The record age is for six less-than-a-predicate constructions. Children should learn that often parts of sentences are left out. Detection games for the missing elements can be used with such structures in combination with listing the "little sentences."

I hope that these few teaching ideas will generate other, more creative ones, and that, in any case, as long as our intermediate pupils are expected to understand difficult structures, we attend to their needs. Parenthetically, I do not feel that all difficult structures should be eliminated from written materials since reading is a major source for language growth; it is simply that we should present ways for understanding them.

Thank you.

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